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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/068,400 | 02/06/2002 | Shigetaka Kobayashi | JP920000346US1 | 9612 |

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| EXAMINER | |
|---|---|
| HARAN, JOHN T | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 1733 | |

DATE MAILED: 12/19/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. 10/068,400 | Applicant(s) KOBAYASHI ET AL. | |
|---|---|---|---|
| | Examiner John T. Haran | Art Unit 1733 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *06 February 2002*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) *8-21* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. §§ 119 and 120**

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *2*.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

## DETAILED ACTION

### *Election/Restrictions*

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:

   I. Claims 1-7, drawn to a method of bonding first and second members with electromagnetic waves, classified in class 156, subclass 272.2.

   II. Claims 8-13, drawn to a method of bonding first and second members using temperature difference suppression, classified in class 156, subclass 282.

   III. Claims 14-19, drawn to a bonding apparatus for bonding first and second members, classified in class 156, subclass 379.6.

   IV. Claims 20-21, drawn to a method of bonding a silicon chip to a glass substrate using infrared energy and temperature difference suppression, classified in class 156, subclass 272.2.

2. The inventions are distinct, each from the other because of the following reasons:

Inventions IV and I are related as combination and subcombination. Inventions in this relationship are distinct if it can be shown that (1) the combination as claimed does not require the particulars of the subcombination as claimed for patentability, and (2) that the subcombination has utility by itself or in other combinations (MPEP § 806.05(c)). In the instant case, the combination as claimed does not require the particulars of the subcombination as claimed because the subcombination does not require the cooling and temperature difference suppression. The subcombination has

separate utility such as bonding together objects other than glass substrates and silicon chips.

3. Inventions IV and II are related as combination and subcombination. Inventions in this relationship are distinct if it can be shown that (1) the combination as claimed does not require the particulars of the subcombination as claimed for patentability, and (2) that the subcombination has utility by itself or in other combinations (MPEP § 806.05(c)). In the instant case, the combination as claimed does not require the particulars of the subcombination as claimed because the subcombination does not require the infrared heating step. The subcombination has separate utility such as bonding together objects other than glass substrates and silicon chips.

4. Inventions I and II are related as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct from each other if they are shown to be separately usable. In the instant case, invention II has separate utility such as achieving a bond between two members without the use of electromagnetic energy. See MPEP § 806.05(d).

5. Inventions I, II, and III and IV are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case the apparatus can be used to practice another and materially different process such as transmitting infrared through a substrate to heat

another substrate or object and not an adhesive or to heat a thermoplastic resin rather than a thermosetting resin.

6. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art because of their recognized divergent subject matter, restriction for examination purposes as indicated is proper.

7. Because these inventions are distinct for the reasons given above and the each group requires search in areas not required of the others restriction for examination purposes as indicated is proper.

8. During a telephone conversation with Arthur Samodovitz on 10/22/03 a provisional election was made with traverse to prosecute the invention of Group I, claims 1-7. Affirmation of this election must be made by applicant in replying to this Office action. Claims 8-21 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

9. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

***Information Disclosure Statement***

10. The information disclosure statement (IDS) submitted on 2/6/02 has been considered by the examiner.

### *Claim Rejections - 35 USC § 112*

11. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

12. Claim 7 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 7 is indefinite because of the limitation that the cooling include the step of subheating the first member. It is unclear what is meant by this limitation. Is applicant trying to claim that the first member is heated before the cooling? What is subheating? Does subheating refer to heat the first member prior to irradiating with electromagnetic waves? It appears applicant means to claim that the first member is heated prior to the electromagnetic wave irradiation, the irradiation occurs and then both the first and second members are cooled. Clarification is requested and appropriate amendment of the claim is required.

### *Claim Rejections - 35 USC § 102*

13. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

14. Claims 1, 3-4, and 6-7 are rejected under 35 U.S.C. 102(b) as being anticipated by Uchiyama et al (U.S. Patent 5,847,796).

Uchiyama et al discloses a method of bonding an IC chip to the glass substrate of a liquid crystal device with a thermosetting anisotropic conductive film (ACF) or other thermosetting resin wherein the ACF is placed between the IC chip and the glass substrate and the ACF is cured to bond the IC chip and glass substrate together by irradiating near infrared energy (electromagnetic waves) through the glass substrate to the ACF to heat and cure the ACF (Column 13, line 61 to Column 14, line 26). Uchiyama et al does not explicitly state that the glass substrate absorbs part of the near infrared energy and transmits the remainder to the ACF, however it is inherent that glass does not have a 100% transmission rate of near infrared energy and that some part of the infrared energy will be absorbed by the glass. Uchiyama et al anticipates claim 1.

Regarding claims 3 and 4, Uchiyama et al discloses that the near infrared energy heats the ACF (Column 14, lines10-13).

Regarding claims 6 and 7, Uchiyama et al discloses that the bonding tool that carries the IC chip to the glass substrate and presses it against the substrate to effect bonding is heated in order to heat the IC chip to a specified temperature prior the near infrared ray exposure (Column 14, lines 27-30) and the substrate and IC chip are allowed to cool after the exposure to the near infrared energy (Column 14, lines 22-26).

***Claim Rejections - 35 USC § 103***

15. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

16. Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uchiyama et al (U.S. Patent 5,847,796) in view of the admitted prior art.

Uchiyama et al is relied upon for the teachings noted above. This rejection is made as an alternative to what was taken as inherent in the 102(b) rejection.

Uchiyama et al does not explicitly state that the glass substrate absorbs part of the near infrared energy and transmits the remainder to the ACF, however the admitted prior art teaches using a conventional glass substrate for the liquid crystal display and that such conventional glass substrate is capable of use in the present application, i.e. the glass substrate absorbs part of the near infrared radiation and transmits part of it to the ACF (specification, page 8, lines 6-16). One skilled in the art would have readily appreciated that known materials for the substrate are usable in the invention and would understand that the glass substrate of Uchiyama et al would also be capable of use in the present invention. Additionally, even if the glass substrate of Uchiyama et al does not absorb part of the near infrared radiation, one skilled in the art would have appreciated using well known and conventional substrates for the liquid crystal device such as those used in the admitted prior art. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a glass substrate for

the liquid crystal device in the method of Uchiyama et al that is capable of absorbing part of the near infrared radiation and transmitting part of it to the ACF, as suggested in the admitted prior art.

Regarding claim 2, one skilled in the art would have readily appreciated that the glass substrate would generate radiant energy as a result of absorbing the near infrared energy and that the radiant heat would be conducted to the ACF in accordance with general heat transfer principles and it would have been obvious for it to have done so in the method of Uchiyama et al, as modified above.

Regarding claims 3 and 4, Uchiyama et al discloses that the near infrared energy heats the ACF (Column 14, lines10-13).

Regarding claim 5, one skilled in the art would have readily appreciated that the wavelength range of the near infrared rays depends upon a variety of factors, such as the material of the ACF and substrate. Furthermore, one skilled in the art would have been motivated to determine the wavelength range, when taken in conjunction with all the other bonding parameters, would result in the quickest and strongest bond. It would have been within the purview of one skilled in the art to determine the necessary wavelength range.

Regarding claims 6 and 7, Uchiyama et al discloses that the bonding tool that carries the IC chip to the glass substrate and presses it against the substrate to effect bonding is heated in order to heat the IC chip to a specified temperature prior the near infrared ray exposure (Column 14, lines 27-30) and the substrate and IC chip are allowed to cool after the exposure to the near infrared energy (Column 14, lines 22-26).

17. Claims 2 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uchiyama et al (U.S. Patent 5,847,796).

Uchiyama et al is relied upon for the teachings noted above.

Regarding claim 2, Uchiyama et al is silent towards whether the absorption of near infrared rays generates radiant heat in the glass substrate that is conducted to the ACF. One skilled in the art would have readily appreciated that the glass substrate would generate radiant energy as a result of absorbing the near infrared energy and that the radiant heat would be conducted to the ACF in accordance with general heat transfer principles. t would have been obvious to one of ordinary skill in the art at the time the invention was made for the absorbed near infrared rays generate heat in the glass substrate that is conducted to the ACF in the method of Uchiyama et al, as modified above.

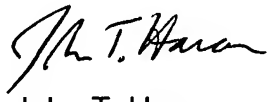
Regarding claim 5, Uchiyama et al teaches irradiating near infrared rays but is silent towards the wavelength range. One skilled in the art would have readily appreciated that the wavelength range of the near infrared rays depends upon a variety of factors, such as the material of the ACF and substrate. Furthermore, one skilled in the art would have been motivated to determine the wavelength range, when taken in conjunction with all the other bonding parameters, would result in the quickest and strongest bond. It would have been within the purview of one skilled in the art to determine the necessary wavelength range.

***Conclusion***

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **John T. Haran** whose telephone number is **(571) 272-1217**. The examiner can normally be reached on M-Th (8 - 5) and alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Crispino can be reached on (571) 272-1226. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.



John T. Haran
Examiner
Art Unit 1733